

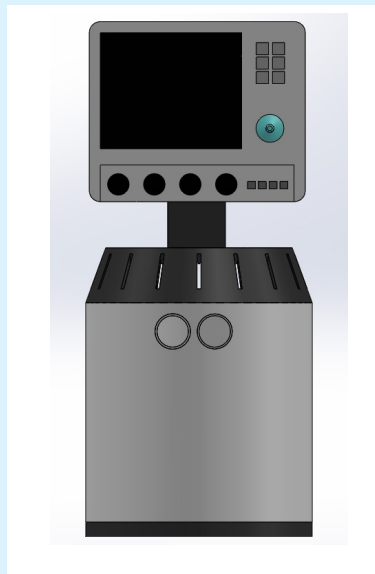
## 18. Title: A turbine based low-cost ventilator

**Inventor:** Prof. P. V. Madhusudhan Rao, Department of Design

**Key Words:** Ventilator, Nasal cannula

**Domain:** Healthcare

**Summary:** An ergonomic machine for a turbine is designed to act as a ventilator. The designed machine could also be used as Hi-Flow nasal cannula. It has a vacuum chamber (directly below the turbine) for mixing of oxygen and air. An oxygen blender is provided to regulate flow rate and pressure of oxygen. A microcontroller pneumatic circuit is utilized to regulate the flow of gases into and out of the patient's lungs in consonance with the mode of operation of the machine. The operating parameters of the machine can be set by an operator. Further, the machine has a fault tolerance mechanism and an alarm system.



*Diagram: Front design of turbine-based Ventilator*

### Advantages:

- » Can be operated in various modes like, volume control, pressure control, assistive control, and volume synchronized intermittent mandatory ventilation modes
- » Compact design of turbine to allow efficient mixing of gases

**Applications:** ventilator cum Hi-Flow Nasal Cannula for patients suffering from inefficient functioning of lungs, or when intubation is undesirable. It can be used to simply oxygenate the lungs and help the patient recover

**Scale of Development:** A functional prototype is developed and its performance is evaluated by deploying at IIT Delhi Laboratory.

**Technology Readiness Level:** 6

**IP Status:** Indian Design Application 347247-001